pro~~ceed~~duce electrophoretic deposition at 70 V and 0.03 A for 10 minutes.

The work electrode ~~completed of~~ treated by vapor deposition was withdrawn, the substrate was separated from the SUS plate, and the mask was removed.

The substrate portion where a pattern had been formed was thermally treated at 100°C in a chamber and was dried, ~~which~~ and was then thermally treated at 300°C for 2 hr. Then aluminum was vapor deposited as an upper electrode, and electric potential was ~~added~~ applied to measure the displacement of the substrate (vibration plate) by piezoelectric phenomenon.

The piezoelectric characteristics represented by the displacement of the vibration plate ~~was more~~ were excellent and better than th~~at~~ose of a piezoelectric/electrostrictive film element produced by the conventional method.

[Example 2]

1 g of fine powder PZT-PMN was added into methoxyethanol 300 ml and acetyl acetone 100 ml, ~~and~~ into which mixed solution, 4 g of PZT sol was added. Then it was dispersed for 30 minutes by a untrasonic generator. Afterwards it was agitated by a magnetic stirrer.

A SUS 316L plate fixed ~~of~~ to a nickel substrate and a mask was prepared as a work electrode and a SUS plate of the same area was prepared as an opposite charge electrode. Then the electrodes were put into the suspension and were connected to an electric supply to pro~~ceed~~duce electrophoretic deposition at 70 V and 0.03 A for 10 minutes.

The work electrode ~~completed of~~ treated by vapor deposition was

withdrawn, the substrate was separated from the SUS plate, and the mask was removed.

~~A~~ The substrate portion where a pattern had been formed was thermally treated at 70°C in a chamber and was dried, ~~which~~ and was then thermally treated at 300°C for 2 hr. Then gold was vapor deposited as an upper electrode, and electric potential was ~~added~~ applied to measure the displacement of the substrate (vibration plate) by piezoelectric phenomenon.

Piezoelectric characteristics represented by the displacement of the vibration plate ~~was more~~ were excellent and better than th~~at~~ose of a piezoelectric/electrostrictive film element produced by the conventional method.

ABSTRACT OF THE DISCLOSURE

~~The present invention relates to~~ A ~~method for forming~~ piezoelectric/electrostrictive film element formed at low temperature using electrophoretic deposition~~, the method comprising~~ by method which includes the steps of: ~~preparing a solution or a dispersed mixture containing constituent ceramic elements by~~ dissolving or dispersing the raw material of constituent ceramic elements in a solvent or a dispersion medium; ~~preparing a mixed solution by~~ adding citric acid into the solution or the dispersed mixture ~~in which the constituent ceramic elements are dissolved or dispersed~~; ~~getting~~ obt. ultrafine ceramic oxide powder of particle size less than 1 μm with uniform particle diameter size distribution by forming ceramic oxide ~~without scattering over,~~ by a nonexplosive oxidative-reductive combustion reaction by thermally treating the mixed solution at 100-500°C; preparing a suspension by dispersing the ultrafine ceramic oxide powder in an organic dispersant; preparing ceramic sol solution by dissolving constituent ceramic elements of the same or similar constituent ~~with~~ as the ultrafine ceramic oxide powder in water or an organic solvent; ~~dispersing by~~ mixing the suspension ~~in which the ultrafine ceramic oxide powder is dispersed~~ with the ceramic sol solution; forming a piezoelectric/electrostrictive film element by submerging a substrate into this mixture ~~the suspension which the ultrafine ceramic oxide powder and the ceramic sol solution are mixed~~ and then by performing electrophoretic deposition; and thermally treating the piezoelectric/electrostrictive film element at 100-600°C.

Also the present invention relates to a **piezoelectric/electrostrictive** film element produced by the